



Barangaroo Station

Water Quality Monitoring Program

N217
BR COP
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Project overview

Project Site Address: Hickson Road Barangaroo NSW 2000	BESIX Watpac State Division Address: Level 24, 44 Market Street SYDNEY NSW 2000
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BESIX Watpac Approvals

Name	Role & Title	Signature	Date
Mike Nevin	Author / Planning & Environment Manager	[REDACTED]	07/09/2022
Daniel Gooch	Reviewer / Engineering Manager	[REDACTED]	07/09/2022

Note: A controlled copy of the Water Quality Monitoring Program (WQMP) will be distributed to the Sydney Metro Principal's Representative, Environmental Representative (ER) and other nominated stakeholders, and it will be made available to all BR COP employees and subcontractors in soft copy format through the project document control system.

This document, when printed, will be uncontrolled and it will be the responsibility of each user to confirm the currency of the plan through the project document control system.

Acronym and Definitions

Acronym	Term and/or Definitions
ASS	Acid Sulphate Soils
ASSMP	Acid Sulfate Soils Management Plan
ARI	Average Rainfall Intensity
BDA	Barangaroo Development Authority (known as iNSW)
BR-CODD	Barangaroo 'Construct Only Delivery Deed'
BR-COP	Barangaroo 'Construct Only Package' (also various documents refer to: BZZ Contractor / STME)
BW	BESIX Watpac
CAR	Corrective Action Request
CEMP	Construction Environmental Management Plan
CMP	Contract Management Plan
CoA	Conditions of Approval
CSG	Construction Safety Group
DITP	Detailed Inspection and Test Plan
DPIE	NSW Department of Planning Industry and Environment
EIS	The Sydney Metro City and Southwest Chatswood to Sydenham Environmental Impact Statement dated 3 May 2016 submitted to the Secretary seeking approval to carry out the CSSI and as revised if required by the Secretary under the EP&A Act.
EMS	The BESIX Watpac certified Environmental Management System
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW)
EPA	NSW Environmental Protection Authority
EPL	Environmental Protection License
GS	General Specification
KPI	Key performance Indicator
N/A	Not applicable
PS	Particular Specification
SFAIRP	So Far As Is Reasonably Practicable (in terms of the RSNL, NSW)
SM	Sydney Metro - Sydney Metro (https://www.sydneymetro.info)
SME	Subject Matter Expert, a person with expert knowledge and competency in a specified subject or topic matter area.
SMP	Sustainability Management Plan
SMCSW	Sydney Metro City & Southwest (the overall program of works, which Barangaroo Station is part of)
SWMS	Safe Work Method Statement
Sydney Metro	Transport for New South Wales (https://www.transport.nsw.gov.au)
TSE	Tunnel and Station Excavation Contractor
WDIA	Water Discharge Impact Assessment
WQMP	Water Quality Monitoring Program
WHS	Work Health and Safety
WTP	Water Treatment Plant

Terms and Definitions

Glossary	Definitions and Responsibilities
CEMP	Construction Environmental Management Plan
Contractor	Particular Specification (PS) must be read as a reference to the “BR Contractor” as defined in the BR-CODD
Contractors Activities	Particular Specification and General Specification must be read as a reference to the “BR Contractor’s Activities” as defined in the BR-CODD
Construction	The same meaning as in the CSSI Sydney Metro City & Southwest Chatswood to Sydenham Conditions of Approval (SSI 7400)
Crisis Event	An event that may have an impact on the community, commuters, environment, personnel or subcontractors or has attracted or can reasonably be expected to attract the attention of the media, the Minister for Transport, a local Member of Parliament, local Authority or the local community. This includes emergencies, incidents or crises unrelated to the Contractor’s Activities that may be deemed to be caused by the Contractor’s Activities due to locality.
Design Documentation	Means the “Final Design Documentation” as defined in the BR-CODD.
Emergency Event	A situation in which there is an unacceptable risk, to the health and wellbeing of occupants, staff, or the general public, which needs intervention by staff or emergency services to control, limit escalation, suppress or address the risk and return to normal operations.
Incident	An occurrence or set of circumstances that causes, or threatens to cause, material harm to the environment, community or many member of the community, being actual or potential hard to the health and safety of human beings or to threatened species, endangered ecological communities or ecosystems that is not trivial
Inspection and Test Plan	Inspection and test plans prepared and implemented by the Contractor in accordance with the requirements in AS/NZS ISO 9001 Quality Management systems – Requirements.
Interface Contractors	Any contractor, consultant, artist, tradesperson or other person engaged by Sydney Metro that is carrying out ,or that will carry out Interface Work including: <ul style="list-style-type: none"> • TSE Contractor • TSOM Contactors • The Operator • LW Contractor • ETS Contractor
Interface Work	Any activities undertaken by an Interface Contractor which interface with or affect, or are affected by, the Contractor’s Activities, the Project Works or the Temporary Works.
Non-Compliance	Failure to comply with the requirements of the Project Approval or any applicable license, permit or legal requirements.
Non-Conformance	Failure to conform to the requirements of project system documentation including this CEMP or supporting documentation
POEO Act	<i>Protection of the Environment Operations Act 1997</i> (NSW)
Relevant Council	City of Sydney
Secretary	Secretary of the NSW Department of Planning and Environment or nominee,
Staging Report	Sydney Metro City & Southwest Chatswood to Sydenham – Staging Report V7

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1. Introduction

The purpose of the Water Quality Monitoring Program (WQMP), as outlined in Section 7.5 of the Soil and Water Management Procedure (SWMP) within the Construction Environmental Management Plan (CEMP), is to monitor the impact of BESIX Watpac's construction activities on groundwater and surface water quality in the vicinity of the site and to monitor the effectiveness of mitigation measures implemented.

2. Background

The Sydney Metro City and Southwest Chatswood to Sydenham Project (The Project) is located in two catchments – the Sydney Harbour and Paramatta River catchment, and the Cooks River catchment. Within these catchments there are five local watercourses that are located along the project alignment. These local watercourses drain into Middle Harbour, Sydney Harbour and Botany Bay. The Barangaroo Metro Station, being constructed by BESIX Watpac, is in the Sydney Harbour and Paramatta River catchment which discharges into the receiving environment, Sydney Harbour.

The Tunnel and Excavation Contractor (TSE) is a JV between John Holland, CPB and Gheller (JGCPBBG), who have undertaken the excavation and construction of the Barangaroo station box structure. The TSE Contractor has been responsible for the management of groundwater, surface water and construction water within the Barangaroo Station site. The TSE Contractor commissioned a Water Treatment Plant (WTP), which is currently treating groundwater and surface water, collected on site via a system of pits and pumps and discharging it into Sydney Harbour under an Environmental Protection License (EPL). The WTP will be handed over to BESIX Watpac at the conclusion of the TSE works on site and BESIX Watpac will continue to operate the WTP whilst completing the fit-out of the station and associated demolition, landscaping and civil works. BESIX Watpac are not required to operate the WTP under an EPL.

This Water Quality Monitoring Program (WQMP) is being implemented to identify potential impacts on water quality resources as well as monitor the effectiveness of the mitigation measures applied as part of the BESIX Watpac's construction activities. BESIX Watpac's focus on water quality management during construction is to prevent pollution by minimising the risk of polluted, sediment-laden or contaminated water leaving the construction site, the outline of which is shown in Figure 1, by always implementing a comprehensive management and monitoring regime on site. Monitoring will be conducted at the discharge point of the WTP (BN-3) and offsite in the receiving waters of Sydney Harbour (SW-B-01) as shown in Figure 1 to trigger investigation where required and ensure that site processes and procedures are effective.

BESIX Watpac commissioned a Water Discharge Impact Assessment (WDIA) to ensure that the existing WTP is fit for purpose for use by BESIX Watpac in treating surface and groundwater within the boundaries of the site, associated with BESIX Watpac's construction activities. The WQMP sets out a program of monitoring to be undertaken to check the quality of water which is being discharged from the WTP, and within the receiving waters of Sydney harbour, to meet the recommendations made in the WDIA and to maintain the NSW Water Quality Objectives in accordance with the Project Condition of Approval (CoA) E-107 (SSI 7400).

No watercourses will be directly impacted or modified by the BESIX Watpac's construction activities although treated construction water will be discharged into Sydney Harbour, via the existing stormwater network and following treatment in the WTP as discussed.

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Figure 1 Barangaroo Metro Station site boundary



3. Approvals

The Project is approved as a Critical State Significant Infrastructure Project (CSSI 7400). The Sydney Metro City and Southwest Chatswood to Sydenham Staging Report Revision 7 (Staging Report) sets out the planning approval requirements relevant to each project site. The Staging Report 'switches on' Construction Monitoring Program requirement CoA C9(a) only for the Barangaroo Station project (Noise and Vibration). According to the Staging Report, Construction Monitoring Program requirements CoAs C9(c) & (d) to CoA C17 are not applicable to the Barangaroo Station project in relation to water quality and groundwater monitoring programs. Notwithstanding this, the WQMP has been produced to monitor the impact of BESIX Watpac's construction activities on groundwater and surface water in the vicinity of the site and to monitor the effectiveness of mitigation measures implemented to meet the requirements of CoA E107 and Section 120 of the POEO Act.

This WQMP will be submitted to Sydney Metro and the Environmental Representative (ER) for information. Water quality monitoring records will be issued in a Construction Water Quality Monitoring Report (CWQMR) which will be issued to Sydney Metro and the ER for information on a quarterly basis.

4. Baseline Data

Water quality monitoring results, taken from monitoring stations SW-B-01 and BN_03, have been provided from Q4 2018 to Q2 2021 by the TSE Contractor and are presented in Appendix B and C of the WDIA. This will establish the baseline water quality data against which BESIX Watpac's construction monitoring data will be compared for the first suite of monitoring undertaken. BESIX Watpac will then monitor against data captured from the previous monitoring event. Baseline data from TSE will be kept for reference and checked if an exceedance occurs to see if there is precedence of this taking place. It should be noted that variances may occur due to:

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- waterways along the Project alignment are highly modified due to the urbanised nature of the surrounding area
- the stormwater system collects and transfers water from large urbanised catchment areas. Therefore, there is the potential for contaminants to enter the stormwater systems and subsequently the waterways from many different sources; and
- Water quality in urban areas as occurs along the Project alignment is highly variable, and
- changes in response to prevailing weather patterns and following rainfall

5. Monitoring

5.1 Monitoring Methodology

For consistency in monitoring results, water quality will continue to be monitored in the same two locations utilised by the TSE Contractor, SW-B-01 located in Sydney Harbour and BN_03 at the WTP discharge point, as shown in Figure 2 below. The TSE Contractor selected these monitoring locations to be representative of water quality and to identify any potential impacts of construction activities at the Barangaroo Metro station site.

The Planning and Environment Manager will have overall responsibility for ensuring that BESIX Watpac's obligations in relation to water quality and water quality monitoring are met. The Environmental Co-ordinator will be responsible for monitoring weather patterns and carrying out in the field sampling. Sampling will include grab, probe and visual inspections of water which will be analysed visually, in the field and at an accredited testing laboratory as nominated in Appendix A.

The WTP discharges water on an ongoing continual basis and has an in-built monitoring system which monitors water quality (pH and turbidity) prior to discharge off site. This monitoring system is connected to an online portal where monitoring results can be seen in real time. The WTP will not allow water to be discharged if the discharge parameters are not met.

Water Quality Reporting will highlight where an exceedance to the nominated trigger value has occurred as follows:

- Exceedances of chemical, physical and toxicant values should be based on the NSW WQO and ANZG 2018 / ANZECC 2000 trigger values.
- In addition to the guideline values, an investigation will take place if a 20% greater differential than previous results occurs for BN-3. This is because something in the treatment process or site activity may have impacted on water quality. If corrective action is required to address the water quality issue, this can be carried out before an exceedance of ANZG 2018 / ANZECC 2000 is recorded. Monitoring against previous results will also determine if there is a trend in the deterioration of water quality.

The groundwater being treated by the WTP, pumped from Basement Level 3 and Basement Level 6, is generally high in iron (ferric) and potassium permanganate is used as part of the treatment process to reduce the iron content in the water, to make it ferrous prior to discharge. Due to the importance of the potassium permanganate dosing system, the following monitoring will be implemented to ensure it functions correctly:

- Potassium Permanganate has impurities which do not dissolve easily in cold weather which can cause a blockage in the dosing pump. The potassium permanganate will be filtered before being added to the WTP to remove impurities
- The pump is checked and maintained regularly at present and this inspection regime will be increased with the pump to be checked each time the potassium permanganate is replaced or topped up
- The storage containers (IBCs) holding the potassium permanganate will be cleaned out and replaced regularly as residue can form at the base of the IBC causing blockages

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- An oxidation reduction probe (ORP) will be added to the discharge monitoring process to check the ferrous / ferric level of the water prior to discharge. If the correct parameters are not met the WTP will not discharge.

Figure 2 Monitoring Station Locations



5.2 Monitoring to be undertaken

Monitoring will be undertaken in accordance with the recommendations as set out in Section 3.5 of the WDIA which summarises the recommended water discharge criteria, to ensure the water quality impact is within the acceptable limits. A summary of the monitoring to be undertaken from the Barangaroo WTP (BN-3) and Sydney Harbour (SW-B-01), the receiving environment is below in Appendix A.

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5.3 Frequency of monitoring

Sampling frequency will continue to be undertaken at Sydney Harbour (SW-B-01), and at the discharge of the Barangaroo WTP (BN-03) in accordance with the recommendations made in Section 6.1 of the WDIA, as follows:

Sydney Harbour(SW-B-01):

Water Quality will be monitored in Sydney Harbour (SW-B-01) with results compared against baselined values throughout the construction phase of the project. Surface water sampling will be carried out in accordance with the recommendations made in the WDIA at the following frequencies:

- Monthly for the same suite of physical, chemical and toxicants which have been monitored by TSE under the EPL at this station plus ammonia, cyanide, copper and zinc
- Up to four wet weather sampling events within a 12 month period (when at least 38.8 mm of rain is received in the catchment in any 5 day period).

Barangaroo WTP (BN-3):

Water quality testing will continue to be carried out on the Barangaroo WTP discharge water at the following frequencies:

- Prior to discharge offsite (monitoring carried out by the WTP in-built monitoring system)
- Following significant inclement weather events > 20 mm in 24 hours
- Quarterly monitoring of the full suite of physical and chemical stressors and toxicants
- Monthly monitoring for ammonia, cyanide, copper and zinc

Groundwater Monitoring (GW-1 and GW-2):

Groundwater sampling will be carried out on a quarterly basis at the Basement 3 (B3) groundwater holding tank (GW-1), as shown in Figure 3, and the Basement 6 (B6) sump at the base of the northern shaft (GW-2), as shown in Figure 4, prior to water being pumped from these locations to the WTP. Quarterly monitoring will take place for the same full suite of physical and chemical stressors and toxicants as are being monitored at BW-3.

Figure 3 B3 Groundwater holding tank (GW-1)



Figure 4 B6 Sump at the base of the northern shaft (GW-2)



6. Sampling Exceedance

A risk-based approach will be implemented in the event of a water sampling exceedance being recorded. An exceedance occurs when the water quality sample parameter is outside of the trigger value range, or exceeding the trigger values shown in Appendix A. The following items will be reviewed as part of the investigation into the exceedance event:

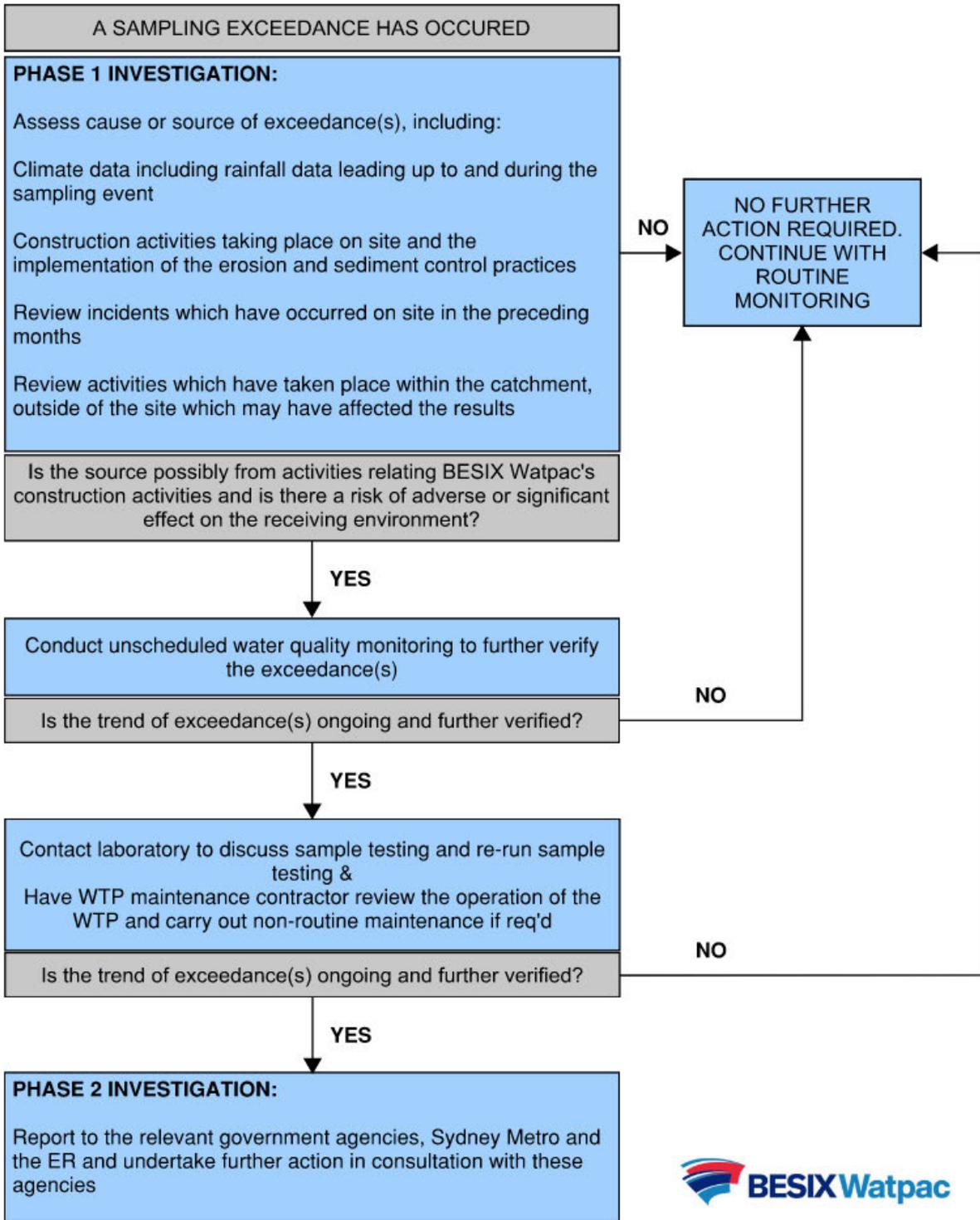
- Climate data including rainfall data leading up to and during the sampling event
- Construction activities taking place on site and the implementation of the ESCP
- Contact laboratory to discuss sample testing and possible re-run of sample
- Review of WTP operations and daily sampling and flow records
- Conduct unscheduled water quality monitoring

The results of the investigation may result in further action including changes to the monitoring program, modifications to certain construction activities, changes to the WTP process or consultation and reporting with the relevant government regulatory. The response action process for water quality exceedances occurring during monitoring is outlined in Figure 5 below:

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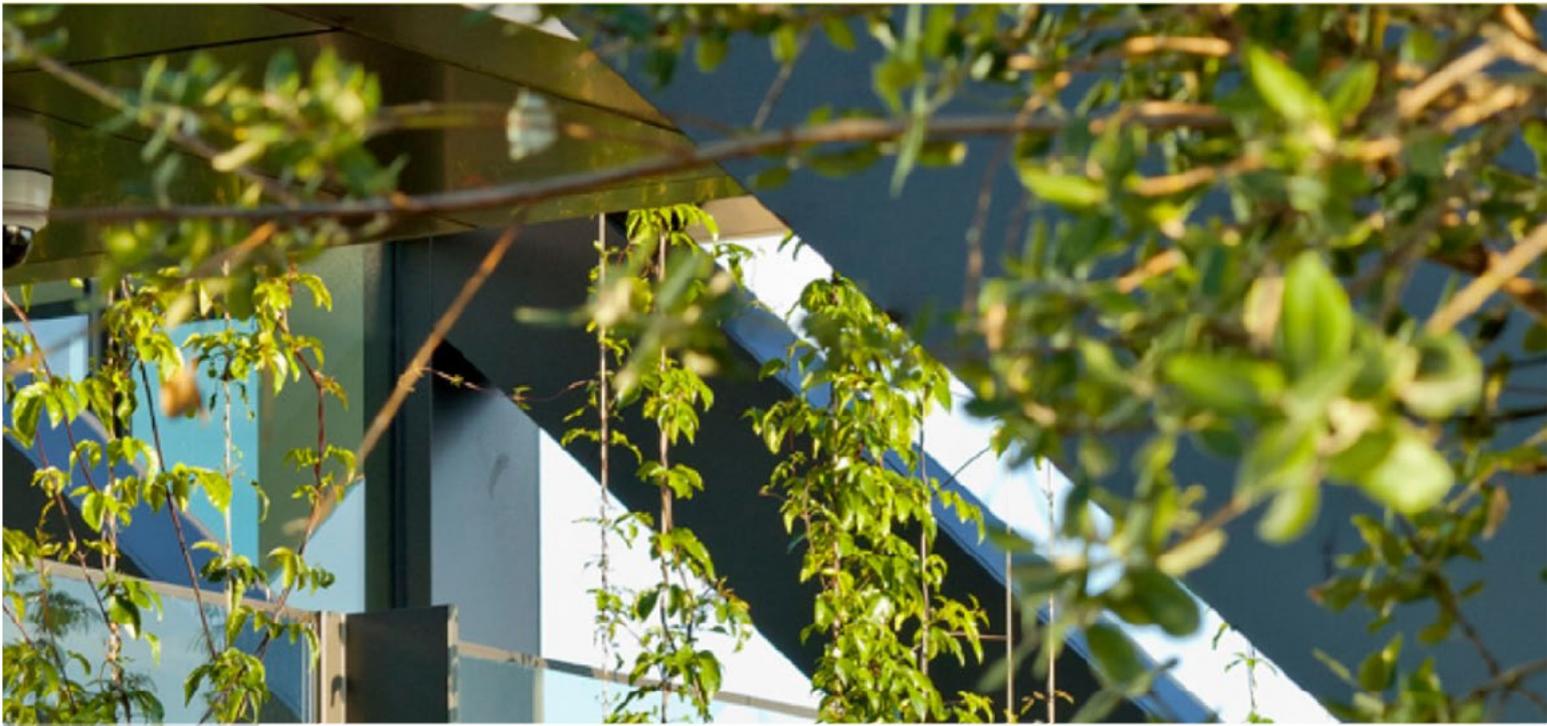
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Figure 5 Action process for exceedances in adopted Water Quality Parameters



7. Reporting

Water quality monitoring records will be issued in a Construction Water Quality Monitoring Report (CWQMR) which will be issued to Sydney Metro and the ER via Teambinder for information on a quarterly basis.



Appendix A Water Quality Monitoring Parameters



Monitoring Station							TRIGGER VALUES		
Sydney Harbour (SB-B-01)	BR WTP (BN-3)	Groundwater (GW-1 & GW-2)	Frequency	Parameter	Sampling Method	Analytical Method	NSW Water quality & ANZECC (2000) (mg/l)	WDIA Recommendation (mg/l)	Additional monitoring
X			Monthly	Temperature (degrees celcius)	Probe	Field Analysis	>80%ile <20%ile		Results are > than the previous monitoring results by 20%
X			Monthly	Dissolved Oxygen (DO %)	Probe	Field Analysis	Lower Limit - 90 Upper Limit - 110	88.7	
X			Monthly	Turbidity (NTU)	Probe	Field Analysis	0.5 - 10		
X			Monthly	Oil and grease	Visual Analysis / Grab sample if required	Visual Analysis		Visible oil and grease	
X			Monthly	Electrical Conductivity (uS/cm)	Probe	Field Analysis (probe)			
X			Monthly	TSS (TSS: mg/L)	Grab Sample	Lab Analysis (grab sample)	50 mg/L		Results are > than the previous monitoring results by 20%
X			Monthly	Iron (mg/L)	Grab Sample	Lab analysis		0.03	
X			Monthly	Manganese (mg/L)	Grab Sample	Lab analysis	0.8		
X			Monthly	pH	Probe	Field Analysis (probe)		pH between 6.5 and 8.5	
	X		Prior to offsite discharge	Turbidity (NTU)	WTP	WTP in-built monitoring		10 NTU**	
	X		Prior to offsite discharge	PH	WTP	WTP in-built monitoring		pH between 6.5 and 8.5	
	X		Daily (when on site)	Oil and Grease	Visual analysis / Grab sample if required	Visual Analysis		Not visible	
X	X		Monthly	Ammonia*	Grab Sample	Lab analysis		2*	
X	X		Monthly	Copper	Grab Sample	Lab analysis	0.008		
X	X		Monthly	Cyanide	Grab Sample	Lab analysis	0.014		
X	X		Monthly	Zinc	Grab Sample	Lab analysis	0.043		
	X		Quarterly	Total Suspended Solids (TSS)	Grab Sample	Lab analysis		TSS at < 50 mg/l	
				Non Metals					
	X	X	Quarterly	Chloride	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Chromium (hexavalent)	Grab Sample	Lab analysis	0.0044		
	X	X	Quarterly	Chromium (trivalent)	Grab Sample	Lab analysis	0.0274		
				Alkali Metals					
	X	X	Quarterly	Calcium	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
				Alkalinity (speciated)					
	X	X	Quarterly	Bicarbonate Alkalinity (as CaCO3)	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Carbonate Alkalinity (as CaCO3)	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Hydroxide Alkalinity (as CaCO3)	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Total Alkalinity (as CaCO3)	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
				Heavy Metals****					
	X	X	Quarterly	Aluminium	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Aluminium (filtered)	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Arsenic	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Arsenic (filtered)	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Cadmium	Grab Sample	Lab analysis	0.0055		
	X	X	Quarterly	Cadmium (filtered)	Grab Sample	Lab analysis	0.0055		
	X	X	Quarterly	Chromium	Grab Sample	Lab analysis	0.0274		
	X	X	Quarterly	Chromium (filtered)	Grab Sample	Lab analysis	0.0055		
	X	X	Quarterly	Iron	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Iron (filtered)	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Lead	Grab Sample	Lab analysis	0.0044		
	X	X	Quarterly	Lead (filtered)	Grab Sample	Lab analysis	0.0044		
	X	X	Quarterly	Manganese	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Manganese (filtered)	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Mercury	Grab Sample	Lab analysis	0.0004		
	X	X	Quarterly	Mercury (filtered)	Grab Sample	Lab analysis	0.0004		
	X	X	Quarterly	Nickel	Grab Sample	Lab analysis	0.07		
	X	X	Quarterly	Nickel (filtered)	Grab Sample	Lab analysis	0.07		
				Organochlorine Pesticides					
	X	X	Quarterly	4,4'-DDD	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	4,4'-DDE	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	4,4'-DDT	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	a-BHC	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Aldrin	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Aldrin and Dieldrin (Total)*	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	b-BHC	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Chlordanes - Total	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	d-BHC	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	DDT + DDE + DDD (Total)*	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Dieldrin	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Endosulfan I	Grab Sample	Lab analysis	0.00001		
	X	X	Quarterly	Endosulfan II	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Endosulfan sulphate	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Endrin	Grab Sample	Lab analysis	0.000008		
	X	X	Quarterly	Endrin aldehyde	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Endrin ketone	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	g-BHC (Lindane)	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Heptachlor	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Heptachlor epoxide	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Hexachlorobenzene	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Methoxychlor	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Toxaphene	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Vic EPA IWRG 621 OCP (Total)*	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Vic EPA IWRG 621 Other OCP (Total)*	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
				Phenols (Halogenated)					
	X	X	Quarterly	2,4,5-Trichlorophenol	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	2,4,6-Trichlorophenol	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	2,4-Dichlorophenol	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%
	X	X	Quarterly	2,6-Dichlorophenol	Grab Sample	Lab analysis			Results are > than the previous monitoring results by 20%

	X	X	Quarterly	2-Chlorophenol	Grab Sample	Lab analysis		Results are > than the previous monitoring results by 20%
	X	X	Quarterly	4-Chloro-3-methylphenol	Grab Sample	Lab analysis		Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Pentachlorophenol	Grab Sample	Lab analysis	0.022	
	X	X	Quarterly	Tetrachlorophenols - Total	Grab Sample	Lab analysis		Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Total Halogenated Phenol	Grab Sample	Lab analysis		Results are > than the previous monitoring results by 20%
				Phenols (non-Halogenated)				
	X	X	Quarterly	2,4-Dimethylphenol	Grab Sample	Lab analysis		Results are > than the previous monitoring results by 20%
	X	X	Quarterly	2,4-Dinitrophenol	Grab Sample	Lab analysis		Results are > than the previous monitoring results by 20%
	X	X	Quarterly	2-Cyclohexyl-4,6-dinitrophenol	Grab Sample	Lab analysis		Results are > than the previous monitoring results by 20%
	X	X	Quarterly	2-Methyl-4,6-dinitrophenol	Grab Sample	Lab analysis		Results are > than the previous monitoring results by 20%
	X	X	Quarterly	2-Methylphenol (o-Cresol)	Grab Sample	Lab analysis		Results are > than the previous monitoring results by 20%
	X	X	Quarterly	2-Nitrophenol	Grab Sample	Lab analysis		Results are > than the previous monitoring results by 20%
	X	X	Quarterly	3&4-Methylphenol (m&p-Cresol)	Grab Sample	Lab analysis		Results are > than the previous monitoring results by 20%
	X	X	Quarterly	4-Nitrophenol	Grab Sample	Lab analysis		Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Dinoseb	Grab Sample	Lab analysis		Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Phenol	Grab Sample	Lab analysis	0.4	
	X	X	Quarterly	Total Non-Halogenated Phenol	Grab Sample	Lab analysis		Results are > than the previous monitoring results by 20%
				Polycyclic Aromatic Hydrocarbons				
	X	X	Quarterly	Acenaphthene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Acenaphthylene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Anthracene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Benz(a)anthracene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Benzo(a)pyrene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Benzo(b&j)fluoranthene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Benzo(g,h,i)perylene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Benzo(k)fluoranthene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Chrysene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Dibenz(a,h)anthracene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Fluoranthene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Fluorene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Indeno(1,2,3-cd)pyrene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Naphthalene	Grab Sample	Lab analysis	0.07	
	X	X	Quarterly	Phenanthrene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Pyrene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Total PAH*				Results are > than the previous monitoring results by 20%
				Total Recoverable Hydrocarbons - 1999 NEPM Fractions				
	X	X	Quarterly	TRH C10-36 (Total)				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	TRH C10-C14				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	TRH C15-C28				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	TRH C29-C36				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	TRH C6-C9				Results are > than the previous monitoring results by 20%
				Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
	X	X	Quarterly	Naphthalene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	TRH >C10-C16				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	TRH >C10-C16 less Naphthalene (F2)				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	TRH >C10-C40 (total)*				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	TRH >C16-C34				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	TRH >C34-C40				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	TRH C6-C10				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	TRH C6-C10 less BTEX (F1)				Results are > than the previous monitoring results by 20%
				Monocyclic Aromatic Hydrocarbons				
	X	X	Quarterly	Benzene	Grab Sample	Lab analysis	0.7	
	X	X	Quarterly	Ethylbenzene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Isopropyl benzene (Cumene)				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	m&p-Xylenes				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	o-Xylene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Styrene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Toluene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Total MAH*				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Xylenes - Total				Results are > than the previous monitoring results by 20%
				Volatile Organics				
	X	X	Quarterly	1,1,1,2-Tetrachloroethane				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	1,1,1-Trichloroethane				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	1,1,2,2-Tetrachloroethane				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	1,1,2-Trichloroethane	Grab Sample	Lab analysis	1.9	
	X	X	Quarterly	1,1-Dichloroethane				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	1,1-Dichloroethene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	1,2,3-Trichloropropane				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	1,2,4-Trimethylbenzene				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	1,2-Dibromoethane				Results are > than the previous monitoring results by 20%
	X	X	Quarterly	1,2-Dichlorobenzene				Results are > than the previous monitoring results by 20%

	X	X	Quarterly	1,2-Dichloroethane					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	1,2-Dichloropropane					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	1,3,5-Trimethylbenzene					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	1,3-Dichlorobenzene					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	1,3-Dichloropropane					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	1,4-Dichlorobenzene					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	2-Butanone (MEK)					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	2-Propanone (Acetone)					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	4-Chlorotoluene					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	4-Methyl-2-pentanone (MIBK)					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Allyl chloride					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Bromobenzene					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Bromochloromethane					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Bromodichloromethane					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Bromoform					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Bromomethane					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Carbon disulfide					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Carbon Tetrachloride					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Chlorobenzene					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Chloroethane					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Chloroform					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Chloromethane					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	cis-1,2-Dichloroethene					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	cis-1,3-Dichloropropene					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Dibromochloromethane					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Dibromomethane					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Dichlorodifluoromethane					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Iodomethane					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Methylene Chloride					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Tetrachloroethene					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	trans-1,2-Dichloroethene					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	trans-1,3-Dichloropropene					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Trichloroethene					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Trichlorofluoromethane					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Vic EPA IWRG 621 CHC (Total)					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Vic EPA IWRG 621 Other CHC (Total)					Results are > than the previous monitoring results by 20%
	X	X	Quarterly	Vinyl chloride					Results are > than the previous monitoring results by 20%

*Ammonia trigger value of 2 mg/l (based off performance of Barangaroo WTP)
80% Species protection
95% Species protection

**The WDIA set the Turbidity trigger value based on the NSW Water Quality Objective value.

***for heavy metals, it's important to know the filtered (dissolved metal concentration) and the total metal concentration (unfiltered sample). Treatment options for potential elevated dissolved metals (filtered) may be different than if the elevation occurs in the unfiltered sample.